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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/028,433

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Young-Sang Byun

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EXAMINER

DUONG, THOI V

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 09/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,433

Applicant(s)

BYUN ET AL.

Examiner

Thoi V. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,6-10 and 12-20 ~~is/are~~ pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-10 and 12-20 ~~is/are~~ rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 26, 2006 has been entered.

Accordingly, claims 3, 5 and 11 were cancelled, and new claims 17-20 were added. Currently, claims 1, 2, 4, 6-10 and 12-20 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to claims 1 and 9 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4, 6, 9, 10 and 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Gutfeld et al. (von Gutfeld, USPN 6,055,035) in view of Paton et al. (Paton, USPN 4,018,383).

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Re claim 1, as shown in Figs. 2A, 2B and 3, von Gutfeld discloses a method of forming a liquid crystal layer on a substrate, comprising:

preparing a liquid crystal material in a projecting portion 20 comprising a LC source 23;

applying a pressure to the projecting portion 20 so as to emit the liquid crystal material (col. 5, lines 11-65);

moving the substrate 1A in one direction (col. 6, lines 8-14); and

depositing the liquid crystal material from the projection portion 20 uniformly onto the substrate during the moving of the substrate in the one direction (col. 5, lines 30-37).

Re claim 9, as shown in Figs. 1, 2A, 2B and 3, von Gutfeld discloses an apparatus for forming a liquid crystal layer on a substrate, comprising:

a projecting portion 20 having a nozzle plate 21 containing a nozzle aperture 22 for emitting a liquid crystal material; and

a stage 1 for moving the substrate 1A in one direction during emitting of the liquid crystal material from the projecting portion 21 uniformly onto the substrate (col. 5, 30-37 and col. 6, lines 8-14).

Von Gutfeld discloses a method of forming a liquid crystal layer on a substrate that is basically the same as that recited in claims 1 and 9 except for a resonator for applying an on voltage during emitting of the liquid crystal material to generate a vibration so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projection portion.

As shown in Fig. II, Paton discloses an ink-jet system comprising:

a resonator 5 (piezoelectric crystal) mounted on a projecting portion 2 (liquid-holding chamber) for generating a vibration upon application of an on voltage to the resonator 5 during emitting of the liquid material (col. 1, lines 6-23 and col. 5, line 65 through col. 7, line 53); and

a resonating plate (impervious membrane) located between the resonator 5 and the projecting portion 2 for transmitting the vibration to the projecting portion 2 so as to apply a pressure to the projecting portion 2 to emit the liquid droplets from the projection portion 2 (col. 7, lines 54-60).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of forming a liquid crystal layer on a substrate of von Gutfeld with the teaching of Paton by employing a resonator for generating a vibration upon application of an on voltage during emitting of the liquid crystal material so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projecting portion into a stream of uniform sized drops being substantially free from satellite drops (col. 7, lines 49-53 and col. 10, lines 12-19).

Re claims 2 and 10, as shown in Fig. 2A, von Gutfeld discloses that the projecting portion 20 has a nozzle plate 21 (fixture) containing a plurality of orifices 22, said nozzle plate adjusting the applied pressure for emitting the liquid crystal material, the liquid crystal material being emitted through the plurality of orifices (col. 5, lines 30-58 and col. 7, lines 47-55).

Re claims 4 and 13, von Gutfeld discloses that the liquid crystal material is emitted and deposited in a vacuum chamber 60 (Figs. 6 and 7, and col. 7, lines 36-55);

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accordingly, it is obvious that the vacuum chamber encompasses the projection portion, the resonator and the resonating plate used to emit the liquid crystal material.

Re claims 15 and 16, as shown in Figs. 2B and 3 of von Gutfeld, the volume of the emitted liquid crystal material is adjusted by a CPU 25 to obtain the correct a correct amount of the liquid crystal material deposited on the panel 1A according to a position of the nozzle plate 21 or the moving substrate (col. 5, line 50 through col. 6, line 14). Accordingly, it is obvious that the CPU 25 is operated by an on voltage according to a position of the nozzle plate 21 or the moving substrate so as to allow a uniform amount of the liquid crystal material to be ejected through the nozzle plate (col. 5, line 50 through col. 6, line 14).

Re claim 6, Paton suggests that the generated vibration is transmitted to the projecting portion 2 through a resonating plate (impervious membrane) (col. 7, lines 54-60).

Re claim 12, as shown in Fig. 3, since von Gutfeld discloses that the stage 1 is moved in relation to a fixed projection portion 20 (col. 6, lines 8-14), it is obvious that means is provided for moving the stage.

Re claim 14, Paton discloses that means (source of a combined signal) is provided for generating vibration in the resonator 5 (col. 7, lines 12-24 and 42-44).

Re claims 17 and 19, Paton discloses that the liquid material is emitted from the projecting portion by only the pressure applied to the projecting portion (col. 7, lines 49-53).

Re claims 18 and 20, Paton discloses that the liquid material is emitted from the projecting portion by the pressure applied to the projecting portion without applying an electric field to the liquid material during emitting of the liquid material (col. 5, lines 34-54 and col. 7, lines 12-24).

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Gutfeld et al. (von Gutfeld, USPN 6,055,035) in view of Paton et al. (Paton, USPN 4,018,383) as applied to claims 1, 2, 4, 6, 9, 10 and 12-20 above, and further in view of Masazumi et al. (Masazumi, USPN 6,331,884 B1).

As shown in Fig. 4, von Gutfeld discloses at least one of the substrates, 1A or 1B, having a sealed pattern 41 (col. 7, lines 24-27). However, von Gutfeld as modified in view of Paton does not disclose a black matrix formed under the sealed pattern, wherein the liquid crystal material start and stop is deposited on the black matrix as recited in claims 7 and 8.

As shown in Fig. 5, Masazumi discloses a black matrix 8 (black light absorbing layer) formed under a sealed pattern 9b' (col. 16, lines 18-23), wherein a liquid crystal material 9a, 9a', 9a'' start and stop is deposited on the black matrix.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of von Gutfeld with the teaching of Masazumi by formed a black matrix under a sealed pattern for enabling display of a black which is background color when the liquid crystal is transparent (col. 10, lines 1-10).

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Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi V. Duong

A handwritten signature in black ink, appearing to read 'Thoi V. Duong', written in a cursive style.

09/08/2006